

CLAIMS

1. A connected communication terminal that communicates with a connecting communication terminal that requests direct communication via a network, said connected communication terminal comprising:

5 a registration unit operable to register (i) a pair of a device ID and a device name onto a session management server that manages sessions between the communication terminals, and (ii) a pair of the device ID and an address of the connected communication terminal onto a trigger server that notifies the connected communication terminal of a request made by the session management server, the device ID identifying the connected communication terminal, and the device name indicating a name of the connected communication terminal;

10 15 a holding unit operable to hold a permission list that is a list of device names of communication terminals to which direct communication is permitted;

20 25 a polling unit operable to perform, upon receiving a request for a communication with the session management server from the trigger server, polling on the trigger server so as to receive the request from the trigger server;

an address resolution unit operable to receive, from the session management server, at least an address of the connecting communication terminal and a session ID that is unique to the communication with the connecting communication terminal; and

30 a Peer-to-Peer communication unit operable to perform direct communication with the connecting communication terminal in the case when the address of the connecting communication terminal and the session ID are received.

2. The connected communication terminal according to Claim 1, further comprising

a list transmission unit operable to transmit the permission list to the session management server in the case when the request for the communication with the session management server is received.

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3. The connected communication terminal according to Claim 1, further comprising

an inquiry unit operable to inquire the session management server of the device name of the connecting communication terminal in the case when the request for the communication with the session management server is received;

a judgment unit operable to judge whether or not the device name is included in the permission list in the case of receiving the device name from the session management server;

15 and

a judgment result transmission unit operable to transmit a result of judgment made by said judgment unit to the session management server.

20 4. The connected communication terminal according to any one of Claim 1 through Claim 3,

wherein the permission list includes device names of communication terminals to which direct communication is refused.

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5. The connected communication terminal according to Claim 1,

wherein said address resolution unit is operable to receive, from the session management server, at least the address of the connecting communication terminal, the session ID, and a permitted duration during which the communication between the communication terminals is permitted, and

5 said Peer-to-Peer communication unit is operable to start a Peer-to-Peer communication with the connecting communication terminal, and to terminate the communication in the case when all of data communication is completed or where the permitted duration expires.

6. The connected communication terminal according to Claim 5,

10 wherein said Peer-to-Peer communication unit is operable to transmit a permitted-duration extension request for requesting an extension of the permitted duration, in the case when the communication with the connecting communication terminal continues after the permitted duration expires.

15 7. The connected communication terminal according to Claim 5,

20 wherein said address resolution unit is operable to receive, from the session management server, the address of the connecting communication terminal, the session ID, an encryption communication key, and the permitted duration during which the communication between the communication terminals is permitted, and

25 said Peer-to-Peer communication unit is operable to perform encryption on data using the encryption communication key during the communication with the connecting communication terminal.

8. The connected communication terminal according to Claim 1, further comprising

30 an end notification unit operable to send a communication end notification to the session management server in the case when the communication with the connecting communication

terminal is terminated.

9. The connected communication terminal according to Claim 1,

5 wherein said Peer-to-Peer communication unit is operable to terminate the communication with the connecting communication terminal in the case when a communication end command is received from the trigger server.

10 10. The connected communication terminal according to Claim 1, further comprising

a data transmission unit operable to regularly transmit address notification data to the trigger server, the address notification data being made up of (i) a header section that 15 includes at least the address of the connected communication terminal and an address of the trigger server, and (ii) a data section that includes at least the device ID of the connected communication terminal.

20 11. A connecting communication terminal that performs direct communication with a connected communication terminal via a network, said connecting communication terminal comprising:

a registration unit operable to register (i) a pair of a device 25 ID and a device name onto a session management server that manages sessions between the communication terminals, and (ii) a pair of the device ID and an address of the connecting communication terminal onto a trigger server that notifies the connected communication terminal of a request made by the session management server, the device ID identifying the 30 connecting communication terminal, and the device name indicating a name of the connecting communication terminal;

a receiving unit operable to receive a request for a

connection to the connected communication terminal;

5 a transmission unit operable to transmit device names of the connecting communication terminal and the connected communication terminal to the session management server, in the case when the request is received;

10 an address resolution unit operable to obtain an address of the connected communication terminal by receiving, from the session management server, at least the address of the connected communication terminal and a session ID that is unique to the communication with the connected communication terminal, after the transmission performed by said transmission unit; and

15 a Peer-to-Peer communication unit operable to perform direct communication with the connected communication terminal in the case when the address of the connected communication terminal is received.

12. The connecting communication terminal according to Claim 11,

20 wherein said address resolution unit is further operable to receive, from the session management server, the address of the connected communication terminal, the session ID, and a permitted duration during which the communication between the communication terminals is permitted, and

25 said Peer-to-Peer communication unit is operable to start a Peer-to-Peer communication with the connected communication terminal in the case when all of data communication is completed or where the permitted duration expires.

13. The connecting communication terminal according to Claim 12,

30 wherein said Peer-to-Peer communication unit is operable to transmit, to the session management server, a permitted-duration

extension request for requesting an extension of the permitted duration, in the case of continuing the communication with the connected communication terminal after the permitted duration expires.

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14. The connecting communication terminal according to Claim 11,

wherein said address resolution unit is operable to receive, from the session management server, the address of the connected communication terminal, the session ID, the encryption communication key, and a permitted duration during which the communication between the communication terminals is permitted, and

said Peer-to-Peer communication unit is operable to perform encryption on data using the encryption communication key during the direct communication with the connected communication terminal.

15. The connecting communication terminal according to Claim 11, further comprising

an end notification unit operable to send a communication end notification to the session management server in the case when the communication with the connected communication terminal is terminated.

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16. The connecting communication terminal according to Claim 11,

wherein said Peer-to-Peer communication unit is operable to terminate the communication with the connected communication terminal in the case when a communication end command is received from the trigger server.

17. The connecting communication terminal according to Claim 11, further comprising

5 a data transmission unit operable to regularly transmit address notification data to the trigger server, the address notification data being made up of (i) a header section that includes at least the address of the connecting communication terminal and an address of the trigger server, and (ii) a data section that includes at least the device ID of the connecting communication terminal.

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18. A session management server that manages direct communication between a connecting communication terminal and a connected communication terminal, said session management server comprising:

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a storage unit operable to receive and store a pair of device ID and device name that is transmitted from the respective communication terminals, the device ID identifying each of the communication terminals, and the device name indicating a name of each communication terminal;

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a trigger transmission unit operable, upon receiving a connection request in which device names of the connecting communication terminal and the connected communication terminal are described, (i) to extract, based on the device name, a device ID of the connected communication terminal from said storage unit, and (ii) to transmit, to a trigger server, a trigger for requesting the connected communication terminal identified by the device ID to transmit a permission list, the trigger server notifying of the request made to the connected communication terminal, and the permission list being a list of device names of communication terminals to which communication is permitted;

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30 a name search unit operable to search for the device name of the connecting communication terminal in the permission list

after receiving the permission list;

5 an address inquiry unit operable to transmit, to the trigger server, an address inquiry for inquiring about addresses of the connecting communication terminal and the connected communication terminal based on the device IDs of the communication terminals, in the case when the device name of the connecting communication terminal is found in the permission list;

10 a session generation unit operable to generate a session ID that is unique to the communication between the connecting communication terminal and the connected communication terminal; and

15 a transmission unit operable to transmit (i) at least the session ID and the address of the connected communication terminal to the connecting communication terminal, and (ii) at least the session ID and the address of the connecting communication terminal to the connected communication terminal, in the case when said address inquiry unit receives, from the trigger server, the addresses of the communication terminals as a 20 response to the address inquiry.

19. The session management server according to Claim 18, further comprising

25 a permission judgment request generation unit operable (i) to extract the device ID of the connected communication terminal from said storage unit, and (ii) to generate a permission judgment request, the permission judgment request being made for requesting the connected communication terminal identified by the device ID to judge whether or not to permit the direct communication with the connecting communication terminal,

30 wherein said transmission unit is operable to transmit the permission judgment request to the trigger server.

20. The session management server according to Claim 18,
wherein said session generation unit is further operable to
generate a permitted duration during which the communication
between the communication terminals is permitted, and

5 said transmission unit is operable to transmit (i) the session
ID, the permitted duration, and the address of the connected
communication terminal, to the connecting communication
terminal, and (ii) the session ID, the permitted duration and the
address of the connecting communication terminal, to the
10 connected communication terminal, in the case when the
addresses of the communication terminals are received from the
trigger server as a response to the address inquiry.

21. The session management server according to Claim 20,
15 wherein said session generation unit is further operable to
generate a new, extended permitted-duration, in the case when a
permitted-duration extension request is received from the
connecting communication terminal or the connected
communication terminal, the permitted-duration extension request
20 being made for requesting an extension of the permitted duration,
and

 said transmission unit is operable to transmit the new
permitted-duration to the connecting communication terminal and
the connected communication terminal.

25 22. The session management server according to Claim 20 or
Claim 21,

 wherein the permitted duration is one of the following: a
time limit for direct communication; and a maximum amount of
30 data permitted during direct communication.

23. The session management server according to Claim 18,

wherein said session generation unit is further operable to generate an encryption communication key to be used for the direct communication between the connecting communication terminal and the connected communication terminal, and

5 said transmission unit is operable to transmit (i) the session ID, the permitted duration, the encryption communication key and the address of the connected communication terminal, to the connecting communication terminal, and (ii) the session ID, the permitted duration, the encryption communication key, and the address of the connecting communication terminal, to the 10 connected communication terminal.

24. The session management server according to Claim 18, further comprising

15 an end processing unit operable to (i) receive an end notification indicating that the direct communication is terminated, from the connecting communication terminal or the connected communication terminal, and (ii) to manage the direct communication.

20 25. The session management server according to Claim 24, wherein said end processing unit is further operable to generate an end command for terminating the direct communication between the connecting communication terminal and the connected communication terminal, and said transmission unit is operable to transmit the end command to the trigger server.

25 30. A trigger server that manages addresses of a connecting communication terminal and a connected communication terminal, and that notifies the connected communication terminal of a request, the trigger server comprising:

an address storage unit operable to receive and store a pair of device ID and address that is transmitted from the respective communication terminals, the device ID identifying each of the communication terminals;

5 a receiving unit operable to receive, from a session management server, a trigger for requesting a transmission of a permission list, the session management server managing sessions between the connecting communication terminal and the connected communication terminal, and the permission list being
10 a list of device names of communication terminals to which communication is permitted;

15 a trigger processing unit operable to transmit, to the connected communication terminal, the request of transmitting the permission list to the session management server, in the case when the trigger is received; and

a polling receiving unit operable to receive polling performed by the connected communication terminal, so as to transmit the request.

20 27. The trigger server according to Claim 26, further comprising:

25 an address inquiry receiving unit operable to receive an address inquiry for inquiring about the addresses corresponding to the device IDs of the connecting communication terminal and the connected communication terminal; and

30 an address response unit operable (i) to extract the addresses identified by the device IDs of the communication terminals from among the pairs, each being made up of a device ID and an address and stored in said address storage unit, and (ii) to transmit the extracted addresses to the session management server.

28. The trigger server according to Claim 26,
wherein said receiving unit is further operable to receive,
from the session management server, a trigger for requesting a
result of a search made in a permission list, the search being
conducted for finding the device name of the connecting
5 communication terminal, and the permission list being a list of
device names of communication terminals to which communication
is permitted, and

10 said trigger processing unit is operable to transmit the
request for the search result in the case when the trigger is
received.

29. The trigger server according to Claim 26,
wherein the trigger server is further operable (i) to receive,
15 from the session management server, an end command for
terminating the communication between the connecting
communication terminal and the connected communication
terminal, and (ii) to transmit the end command to the respective
communication terminals.

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30. A program to be used for a connected communication
terminal that communicates with a connecting communication
terminal that requests direct communication via a network, said
program causing a computer to execute:

25 registering (i) a pair of a device ID and a device name onto
a session management server that manages sessions between the
communication terminals, and (ii) a pair of the device ID and an
address of the connected communication terminal onto a trigger
server that notifies the connected communication terminal of a
30 request made by the session management server, the device ID
identifying the connected communication terminal, and the device
name indicating a name of the connected communication

terminal;

holding a permission list that is a list of device names of communication terminals to which direct communication is permitted;

5 performing, upon receiving a request for a communication with the session management server from the trigger server, polling on the trigger server so as to receive the request from the trigger server;

10 receiving, from the session management server, at least an address of the connecting communication terminal and a session ID that is unique to the communication with the connecting communication terminal; and

15 performing direct communication with the connecting communication terminal in the case when the address of the connecting communication terminal and the session ID are received.

31. A program to be used for a connecting communication terminal that performs direct communication with a connected communication terminal via a network, said program causing a computer to execute:

registering (i) a pair of a device ID and a device name onto a session management server that manages sessions between the communication terminals, and (ii) a pair of the device ID and an address of the connecting communication terminal onto a trigger server that notifies the connected communication terminal of a request made by the session management server, the device ID identifying the connecting communication terminal, and the device name indicating a name of the connecting communication terminal;

30 receiving a request for a connection to the connected communication terminal;

transmitting device names of the connecting communication terminal and the connected communication terminal to the session management server, in the case when the request is received;

5 obtaining an address of the connected communication terminal by receiving, from the session management server, at least the address of the connected communication terminal and a session ID that is unique to the communication with the connected communication terminal after said transmitting; and

10 performing direct communication with the connected communication terminal in the case when the address of the connected communication terminal is received.

32. A program to be used for a session management server that manages direct communication between a connecting communication terminal and a connected communication terminal, said program causing a computer to execute:

15 receiving and storing a pair of device ID and device name that is transmitted from the respective communication terminals, the device ID identifying each of the communication terminals, 20 and the device name indicating a name of each communication terminal;

25 upon receiving a connection request in which device names of the connecting communication terminal and the connected communication terminal are described, (i) extracting, based on the device name, a device ID of the connected communication terminal from the stored pairs, and (ii) transmitting, to a trigger server, a trigger for requesting the connected communication terminal identified by the device ID to transmit a permission list, the trigger server notifying of the request made to the connected 30 communication terminal, and the permission list being a list of device names of communication terminals to which communication is permitted;

searching for the device name of the connecting communication terminal in the permission list after receiving the permission list;

5 transmitting, to the trigger server, an address inquiry for inquiring about addresses of the connecting communication terminal and the connected communication terminal based on the device IDs of the communication terminals, in the case when the device name of the connecting communication terminal is found in the permission list;

10 generating a session ID that is unique to the communication between the connecting communication terminal and the connected communication terminal; and

15 transmitting (i) at least the session ID and the address of the connected communication terminal to the connecting communication terminal, and (ii) at least the session ID and the address of the connecting communication terminal to the connected communication terminal, in the case when the addresses of the communication terminals are received from the trigger server as a response to the address inquiry.

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33. A program to be used for a trigger server that manages addresses of a connecting communication terminal and a connected communication terminal, and that notifies the connected communication terminal of a request, said program causing a computer to execute:

receiving and storing a pair of device ID and address that is transmitted from the respective communication terminals, the device ID identifying each of the communication terminals;

30 receiving, from a session management server, a trigger for requesting a transmission of a permission list, the session management server managing sessions between the connecting communication terminal and the connected communication

terminal, and the permission list being a list of device names of communication terminals to which communication is permitted;

transmitting, to the connected communication terminal, the request of transmitting the permission list to the session 5 management server, in the case when the trigger is received; and

receiving polling performed by the connected communication terminal, so as to transmit the request.

34. A communication method to be used for a connected 10 communication terminal that communicates with a connecting communication terminal that requests direct communication via a network, said method comprising:

registering (i) a pair of a device ID and a device name onto a session management server that manages sessions between the 15 communication terminals, and (ii) a pair of the device ID and an address of the connected communication terminal onto a trigger server that notifies the connected communication terminal of a request made by the session management server, the device ID identifying the connected communication terminal, and the device 20 name indicating a name of the connected communication terminal;

holding a permission list that is a list of device names of communication terminals to which direct communication is permitted;

25 performing, upon receiving a request for a communication with the session management server from the trigger server, polling on the trigger server so as to receive the request from the trigger server;

receiving, from the session management server, at least an 30 address of the connecting communication terminal and a session ID that is unique to the communication with the connecting communication terminal; and

performing direct communication with the connecting communication terminal in the case when the address of the connecting communication terminal and the session ID are received.

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35. A communication method to be used for a connecting communication terminal that performs direct communication with a connected communication terminal via a network, said method comprising:

10 registering (i) a pair of a device ID and a device name onto a session management server that manages sessions between the communication terminals, and (ii) a pair of the device ID and an address of the connecting communication terminal onto a trigger server that notifies the connected communication terminal of a request made by the session management server, the device ID identifying the connecting communication terminal, and the device name indicating a name of the connecting communication terminal;

20 receiving a request for a connection to the connected communication terminal;

transmitting device names of the connecting communication terminal and the connected communication terminal to the session management server, in the case when the request is received;

25 obtaining an address of the connected communication terminal by receiving, from the session management server, at least the address of the connected communication terminal and a session ID that is unique to the communication with the connected communication terminal, after the transmission performed in said transmitting; and

30 performing direct communication with the connected communication terminal in the case when the address of the connected communication terminal is received.

36. A communication method to be used for a session management server that manages direct communication between a connecting communication terminal and a connected communication terminal, said method comprising:

5 receiving and storing a pair of device ID and device name that is received from the respective communication terminals, the device ID identifying each of the communication terminals, and the device name indicating a name of each communication terminal;

10 upon receiving a connection request in which device names of the connecting communication terminal and the connected communication terminal are described, (i) extracting, based on the device name, a device ID of the connected communication terminal from the stored pairs, and (ii) transmitting, to a trigger server, a trigger for requesting the connected communication terminal identified by the device ID to transmit a permission list, the trigger server notifying of the request made to the connected communication terminal, and the permission list being a list of device names of communication terminals to which communication

15 is permitted;

20 searching for the device name of the connecting communication terminal in the permission list after receiving the permission list;

25 transmitting, to the trigger server, an address inquiry for inquiring about addresses of the connecting communication terminal and the connected communication terminal based on the device IDs of the communication terminals, in the case when the device name of the connecting communication terminal is found in the permission list;

30 generating a session ID that is unique to the communication between the connecting communication terminal and the connected communication terminal; and

transmitting (i) at least the session ID and the address of the connected communication terminal to the connecting communication terminal, and (ii) at least the session ID and the address of the connecting communication terminal to the connected communication terminal, in the case when the addresses of the communication terminals are received from the trigger server as a response to the address inquiry.

37. A communication method to be used for a trigger server that manages addresses of a connecting communication terminal and a connected communication terminal, and that notifies the connected communication terminal of a request, said method comprising:

receiving and storing a pair of device ID and address that is transmitted from the respective communication terminals, the device ID identifying each of the communication terminals;

receiving, from a session management server, a trigger for requesting a transmission of a permission list, the session management server managing sessions between the connecting communication terminal and the connected communication terminal, and the permission list being a list of device names of communication terminals to which communication is permitted;

transmitting, to the connected communication terminal, the request of transmitting the permission list to the session management server, in the case when the trigger is received; and

receiving polling performed by the connected communication terminal, so as to transmit the request.

38. A communication system comprising: a connecting communication terminal, a connected communication terminal, a session management server that manages sessions between said communication terminals, and a trigger server that notifies the

connected communication terminal of a request made by said session management server,

wherein said connected communication terminal includes:

a registration unit operable to register (i) a pair of a device

5 ID and a device name onto a session management server that manages sessions between the communication terminals, and (ii) a pair of the device ID and an address of the connected communication terminal onto a trigger server that notifies the connected communication terminal of a request made by the session management server, the device ID identifying the connected communication terminal, and the device name indicating a name of the connected communication terminal;

10 a holding unit operable to hold a permission list that is a list of device names of communication terminals to which direct communication is permitted;

15 a polling unit operable to perform, upon receiving a request for a communication with the session management server from the trigger server, polling on the trigger server so as to receive the request from the trigger server;

20 an address resolution unit operable to receive, from the session management server, at least an address of the connecting communication terminal and a session ID that is unique to the communication with the connecting communication terminal; and

25 a Peer-to-Peer communication unit operable to perform direct communication with the connecting communication terminal in the case when the address of the connecting communication terminal and the session ID are received,

30 said connecting communication terminal includes:

a registration unit operable to register (i) a pair of a device

35 ID and a device name onto a session management server that manages sessions between the communication terminals, and (ii) a pair of the device ID and an address of the connecting

communication terminal onto a trigger server that notifies the connected communication terminal of a request made by the session management server, the device ID identifying the connecting communication terminal, and the device name
5 indicating a name of the connecting communication terminal;

a receiving unit operable to receive a request for a connection to the connected communication terminal;

a transmission unit operable to transmit device names of the connecting communication terminal and the connected
10 communication terminal to the session management server, in the case when the request is received;

an address resolution unit operable to obtain an address of the connected communication terminal by receiving, from the session management server, at least the address of the connected
15 communication terminal and a session ID that is unique to the communication with the connected communication terminal, after the transmission performed by said transmission unit; and

a Peer-to-Peer communication unit operable to perform direct communication with the connected communication terminal
20 in the case when the address of the connected communication terminal is received,

said session server includes:

a storage unit operable to receive and store a pair of device
25 ID and device name that is received from the respective communication terminals, the device ID identifying each of the communication terminals, and the device name indicating a name of each communication terminal;

a trigger transmission unit operable, upon receiving a connection request in which device names of the connecting
30 communication terminal and the connected communication terminal are described, (i) to extract, based on the device name, a device ID of the connected communication terminal from said

storage unit, and (ii) to transmit, to a trigger server, a trigger for requesting the connected communication terminal identified by the device ID to transmit a permission list, the trigger server notifying of the request made to the connected communication terminal, and the permission list being a list of device names of communication terminals to which communication is permitted;

5 a name search unit operable to search for the device name of the connecting communication terminal in the permission list after receiving the permission list;

10 an address inquiry unit operable to transmit, to the trigger server, an address inquiry for inquiring about addresses of the connecting communication terminal and the connected communication terminal based on the device IDs of the communication terminals, in the case when the device name of 15 the connecting communication terminal is found in the permission list;

20 a session generation unit operable to generate a session ID that is unique to the communication between the connecting communication terminal and the connected communication terminal; and

25 a transmission unit operable to transmit (i) at least the session ID and the address of the connected communication terminal to the connecting communication terminal, and (ii) at least the session ID and the address of the connecting communication terminal to the connected communication terminal, in the case when said address inquiry unit receives, from the trigger server, the addresses of the communication terminals as a response to the address inquiry, and

30 said trigger server includes:

35 an address storage unit operable to receive and store a pair of device ID and address that is transmitted from the respective communication terminals, the device ID identifying each of the

communication terminals;

a receiving unit operable to receive, from a session management server, a trigger for requesting a transmission of a permission list, the session management server managing sessions between the connecting communication terminal and the connected communication terminal, and the permission list being a list of device names of communication terminals to which communication is permitted;

a trigger processing unit operable to transmit, to the connected communication terminal, the request of transmitting the permission list to the session management server, in the case when the trigger is received; and

a polling receiving unit operable to receive polling performed by the connected communication terminal, so as to transmit the request.